Lattice, site, and plasmon resonances in structured metal films

F. J. García de Abajo
Donostia International Physics Center and Centro Mixto CSIC-UPV/EHU,
San Sebastián, Spain,

Structured metallic surfaces display a rich variety of resonances that can be classified into three distinct categories: lattice resonances associated to periodic structures, site resonances originating in localized modes at specific sites, and intrinsic modes like surface plasmons. This classification is illustrated by means of several examples: light transmission through hole arrays, transmission assisted by hopping through buried structures, transmission through holes filled with high-index dielectrics, etc. The interaction between these types of resonances is also discussed. Applications of the above examples will include proposals for perfect light absorbers and invisible metals.

This work has been done in collaboration with J. J. Sáenz, G. Gómez Santos, T. V. Teperik, V. V. Popov, A. B. Borisov, S. V. Shabanov, L. A. Blanco, and R. Gómez Medina.